

IAF MICROGRAVITY SCIENCES AND PROCESSES SYMPOSIUM (A2)
Microgravity Sciences on board of Space stations (6)

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CAN ACOUSTIC LEVITATION SIMULATE MICROGRAVITY IN FLUIDS?

Abstract

Simulating microgravity is essential for advancing the study of physical processes in space. Historically, access to such simulations has been limited due to the significant costs and technical complexity of conventional methods. This study introduces a prototype acoustic levitation system, specifically tailored for simulating microgravity conditions in fluids of different viscosities. It involves the use of Class D audio amplifiers, 3D printed ASA (Acrylonitrile Styrene Acrylate) for the levitation chamber, and Arduino microcontrollers to regulate the audio amplifiers. Through statistical analysis, we will evaluate the correlation between the data obtained from changes in their physical properties and those collected in the Fluid Science Laboratory of the European Space Agency, allowing us to establish the system's effectiveness in replicating a microgravity environment. The proposed prototype aims not only to democratize access to this type of space research but also to expand the frontiers of studying low-density materials, such as fine particles and volatile chemical compounds, under simulated microgravity conditions.